


GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE: November 11, 2011
TO: Chris Lanane, Scott Weaver
FROM: Mike Horn 
SUBJECT: Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Lizard Tail, November 11, 2011," for your review. Please refer any comments you may have on the document to me by January 11, 2012. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District
Quality Assurance
Audit Report

SITE:
LIZARD TAIL

Report Date: November 11, 2011
Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Lizard Tail was audited on November 9, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

Great Basin Unified Air Pollution Control District
Tapered Element Oscillating Microbalance (TEOM)
AUDIT

Date of report: 11/11/11	Site name: Lizard Tail
Date: 11/9/11	Operator: Scott Weaver
Start: 14:00hrs. PST	Project: SB 270
Finish: 14:20hrs. PST	Site Elevation: 3603 ft.
Audited By: Mike Horn	Amb. Pres.: 904.30 hPa
Witness: Scott Weaver	Amb. Temp.: 19.2 deg. C
Prop. or Serial No.: 24983	Make: R & P
Type: PM-10	Model: 1400ab
	Last cal. date: 9/22/11

AUDIT DEVICE(S)

Make: BGI Incorporated

Model: DELTA CAL

S/N: 525

Range: 2 - 20 lpm

Calibration Factors

Slope: 1.00

Intercept: 0.00

Cal date: 1/4/11

Main: Aux:

Leak check: 0.060 0.380

Dark current: N/A N/A

$$Qa=[dPxTa/Pa]^{1/2}+b$$

Audit Point	<u>Audit Flow Rate,</u>	<u>(VLPM)</u>
	$\Delta P, \text{ in. H}_2\text{O}$	(VLPM)

Sampler temp: 18.9

Site
Flow Rate
(VLPM)

Make: BGI Incorporated

Model: DELTA CAL

S/N: 525

Range: 2 - 20 lpm

Calibration Factors

Slope: 1.00

Intercept: 0.00

Cal Date: 1/4/11

<u>Diff.</u>	Sampler press:	<u>Diff.</u>
-0.3	898.53	-5.8

Nominal Flow Rates

	<u>Audit Flow Rate,</u>	<u>(VLPM)</u>	<u>Site</u>	<u>Diff.</u>	<u>Nominal Flow Rates</u>	<u>Upper Limit</u>
Audit Point	$\Delta P, \text{ in. H}_2\text{O}$	(VLPM)	(VLPM)	$(\%)$	(LPM)	(LPM)
Total Flow Rate	16.88	16.88	16.63	-1.5	15.0	18.4
Bypass/ Aux Flow Rate	13.73	13.73	13.64	-0.7		
Main Flow Rate	3.04	3.04	2.99	-1.6	2.7	3.3
Total Flow Rate	16.83	16.83	16.63	-1.2	15.0	18.4

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

<u>Measurement Variable</u>	<u>Evaluation Criteria</u>
Wind Speed	At $ws \leq 5$ m/s, input ± 0.25 m/s; At $ws > 5$ m/s, input $\pm 5\%$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direction	input $\pm 5^\circ$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperature	input $\pm 0.5^\circ$ C Gravimetry Lab ± 1.0 deg. C input $\pm 2.0^\circ$ C for PM-10, PM-2.5 samplers
Relative Humidity	Ambient: input $\pm 5\%$ RH, $\pm 1.5^\circ$ C as dew point Gravimetry Lab: input $\pm 5\%$
Precipitation	input $\pm 10\%$
Barometric Pressure	Ambient: input ± 10 hPa TEOM: ± 10 mm mercury
PM-10: Hi-Vol SSI, Partisol, BGI, PM-2.5	input $\pm 10\%$; Design Flow $\pm 10\%$ input $\pm 4\%$; Design Flow $\pm 5\%$
TEOM: Total Flow Main Flow Bypass Flow	input $\pm 10\%$; Design Flow $\pm 10\%$ input $\pm 10\%$; Design Flow $\pm 10\%$ input $\pm 10\%$; Design Flow $\pm 10\%$
TEOM: Leak Check	Main Flow: < 0.15 LPM Bypass Flow: < 0.60 LPM

Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE

	<u>Serial #</u>	<u>Cal Date:</u>	<u>Slope:</u>	<u>Intercept:</u>
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CU10, HS10	8/30/11	N/A	N/A
Psychro-Dyne Psychrometer:	RH 04	N/A	1 0	1 0
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

**Great Basin Unified Air Pollution Control District
Tapered Element Oscillating Microbalance (TEOM)**

FLOW AUDIT

Date: 11/9/11
Start: 14:00
Finish: 14:20

PST
PST

Site Name: *Sagehen Tail*
Operator: *Scott Weaver*
Project: SB270

Site Elevation: ft
Amb. Press.: 984.3 in. Hg
Amb. Temp.: 78.2 deg. C

Prop. Or Ser. No.: 24983
Type: PM10

Make: R&P
Model: 1400a
Last Cal. Date: 9/22/11

Audit Device(s)

Make: BGI INCORPORATED
Model: DELTA CAL
S/N: 0123-525
Range: 2 - 20 lpm

Make: BGI INCORPORATED
Model: DELTA CAL
S/N: 0123
Range: 2 - 20 lpm

Calibration factors:
Slope: 1.0
Int.: 0.0
Cal Date: 1/4/11

Calibration factors:
Slope: 1.0
Int.: 0.0
Cal Date:

$$Q_s = m[dP \times T_s / P_s]^{1/2} + b$$

Altitude Correction Factor: $\div 1013$

Leak Check-Initial Main: 0.06 Aux: 0.38
Leak Check-Final Main: Aux:

Audit Point	Audit Flow Rate		Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates	
	delta P	(VLPM)			Lower Limit (LPM)	Upper Limit (LPM)
Total Flow Rate	16.88		2.99/13	64 = 16.63	15.0	18.4
Aux. Flow Rate	13.73		13.64			
Main Flow Rate	3.04		2.99		2.7	3.3
Total Flow Rate	16.83		16.63		15.0	18.4

	Sampler	Standard	
		True	Raw
Amb Temp	18.9		19.2
Amb Press	887	898.53	904.3


Comments:

Calibrated By:

Mike [Signature]

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE: July 7, 2011
TO: Chris Lanane, Scott Weaver
FROM: Mike Horn 
SUBJECT: Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Lizard Tail, July 7, 2011," for your review. Please refer any comments you may have on the document to me by September 7, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District
Quality Assurance
Audit Report

SITE:
LIZARD TAIL

Report Date: July 7, 2011
Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Lizard Tail was audited on July 6, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

Great Basin Unified Air Pollution Control District
Tapered Element Oscillating Microbalance (TEOM)
AUDIT

Date of report:	7/7/11	Site name:	Lizard Tail
Date:	7/6/11	Operator:	Scott Weaver
Start:	13:15hrs. PST	Project:	SB 270
Finish:	13:L35hrs. PST	Site Elevation:	3603 ft.
Audited By:	Mike Horn	Amb. Pres.:	893.60 hPa
Witness:	Scott Weaver	Amb. Temp.:	33.9 deg. C
Prop. or Serial No.:	24983	Make:	R & P
Type:	PM-10	Model:	1400ab
		Last cal. date:	6/8/11

AUDIT DEVICE(S)

Make: BGI Incorporated
Model: DELTA CAL
S/N: 525
Range: 2 - 20 lpm

Calibration Factors

Slope: 1.00
Intercept: 0.00
Cal date: 1/4/11

Make: BGI Incorporated
Model: DELTA CAL
S/N: 525
Range: 2 - 20 lpm

Calibration Factors

Slope: 1.00
Intercept: 0.00
Cal Date: 1/4/11

	Main:	Aux:	Sampler temp:	<u>Diff.</u>	Sampler press:	<u>Diff.</u>
Leak check:	0.100	0.380	32.8	-1.1	890.43	-3.2
Dark current:	N/A	N/A				

$$Qa=[dPxTa/Pa]^{1/2}+b$$

Audit Point	Audit Flow Rate, ΔP , in. H ₂ O		Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates	
		(VLPM)			Lower Limit (LPM)	Upper Limit (LPM)
Total Flow Rate	16.46	16.46	16.63	1.0	15.0	18.4
Bypass/Aux Flow Rate	13.46	13.46	13.64	1.3		
Main Flow Rate	2.93	2.93	2.99	2.0	2.7	3.3
Total Flow Rate	16.39	16.39	16.63	1.5	15.0	18.4

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

<u>Measurement Variable</u>	<u>Evaluation Criteria</u>
Wind Speed	At $ws \leq 5$ m/s, input ± 0.25 m/s; At $ws > 5$ m/s, input $\pm 5\%$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direction	input $\pm 5^\circ$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperature	input $\pm 0.5^\circ$ C input $\pm 2.0^\circ$ C for PM-10, PM-2.5 samplers
Relative Humidity	Ambient: input $\pm 5\%$ RH, $\pm 1.5^\circ$ C as dew point Gravimetry Lab: input $\pm 5\%$
Precipitation	input $\pm 10\%$
Barometric Pressure	Ambient: input ± 10 hPa TEOM: ± 10 mm mercury
PM-10: Hi-Vol SSI, Partisol, BGI, PM-2.5	input $\pm 10\%$; Design Flow $\pm 10\%$ input $\pm 4\%$; Design Flow $\pm 5\%$
TEOM: Total Flow Main Flow Bypass Flow	input $\pm 10\%$; Design Flow $\pm 10\%$ input $\pm 10\%$; Design Flow $\pm 10\%$ input $\pm 10\%$; Design Flow $\pm 10\%$
TEOM: Leak Check	Main Flow: < 0.15 LPM Bypass Flow: < 0.60 LPM

Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE

	<u>Serial #</u>	<u>Cal Date:</u>	<u>Slope:</u>	<u>Intercept:</u>
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:	RH 03	12/10/04	Wet 1.0037 Dry 1.0059	Wet -0.0598 Dry -0.1518
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

Great Basin Unified Air Pollution Control District
Tapered Element Oscillating Microbalance (TEOM)

FLOW AUDIT

Date: 7/6/11
Start: 13:15
Finish: 13:35

PST
PST

Site Name: *Sagehen Trail*
Operator: *Scott Wearn*
Project: SB270

Site Elevation: ft
Amb. Press.: 893.6 in. Hg
Amb. Temp.: 33.9 deg. C

Prop. Or Ser. No.: 24983
Type: PM10

Make: R&P
Model: 1400a
Last Cal. Date: 6/8/11

Audit Device(s)

Make: BGI INCORPORATED
Model: DELTA CAL
S/N: 0123-525
Range: 2 - 20 lpm

Make: BGI INCORPORATED
Model: DELTA CAL
S/N: 0123
Range: 2 - 20 lpm

Calibration factors:
Slope: 1.0
Int.: 0.0
Cal Date: 1/4/11

Calibration factors:
Slope: 1.0
Int.: 0.0
Cal Date:

$$Q_s = m[dP \times T_s / P_s]^{1/2} + b$$

Altitude Correction Factor: $\div 1013$

Leak Check-Initial Main: 10
Leak Check-Final Main:

Aux: 38
Aux:

Audit Point	Audit Flow Rate		Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates	
	delta P	(VLPM)			Lower Limit (LPM)	Upper Limit (LPM)
Total Flow Rate	16.46		2.99/13.64 = 16.63		15.0	18.4
Aux. Flow Rate	13.46		13.64			
Main Flow Rate	2.99		2.99		2.7	3.3
Total Flow Rate	13.39		16.63		15.0	18.4


	Sampler	Standard	
		True	Raw
Amb Temp	32.8		33.9
Amb Press	879	890.43	893.6

Comments:

Calibrated By: *Mike [Signature]*

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE: April 21, 2011
TO: Chris Lanane, Scott Weaver
FROM: Mike Horn 
SUBJECT: Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Lizard Tail, April 21, 2011," for your review. Please refer any comments you may have on the document to me by June 21, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District
Quality Assurance
Audit Report

SITE:
LIZARD TAIL

Report Date: April 21, 2011
Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Lizard Tail was audited on April 20, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

Great Basin Unified Air Pollution Control District
Tapered Element Oscillating Microbalance (TEOM)
AUDIT

Date of report: 4/21/11
Date: 4/20/11
Start: 13:25hrs. PST
Finish: 13:45hrs. PST
Audited By: Mike Horn
Witness: Scott Weaver

Site name: Lizard Tail
Operator: Scott Weaver
Project: SB 270
Site Elevation: 3603 ft.
Amb. Pres.: 886.40 hPa
Amb. Temp.: 25.6 deg. C
Make: R & P
Model: 1400ab
Last cal. date: 3/17/11

Prop. or Serial No.: 24983
Type: PM-10

AUDIT DEVICE(S)

Make: BGI Incorporated
Model: DELTA CAL
S/N: 525
Range: 2 - 20 lpm

Calibration Factors

Slope: 1.00
Intercept: 0.00
Cal date: 1/4/11

Make: BGI Incorporated
Model: DELTA CAL
S/N: 525
Range: 2 - 20 lpm

Calibration Factors

Slope: 1.00
Intercept: 0.00
Cal Date: 1/4/11

	Main:	Aux:	Sampler temp:	<u>Diff.</u>	Sampler press:	<u>Diff.</u>
Leak check:	0.050	0.380	25.2	-0.4	883.34	-3.1
Dark current:	N/A	N/A				

$$Qa=[dPxTa/Pa]^{1/2}+b$$

Audit Point	Audit Flow Rate,		Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates	
	ΔP , in. H ₂ O	(VLPM)			Lower Limit (LPM)	Upper Limit (LPM)
Total Flow Rate	16.49	16.49	16.63	0.8	15.0	18.4
Bypass/Aux Flow Rate	13.36	13.36	13.64	2.1		
Main Flow Rate	2.91	2.91	2.99	2.7	2.7	3.3
Total Flow Rate	16.46	16.46	16.63	1.0	15.0	18.4

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

<u>Measurement Variable</u>	<u>Evaluation Criteria</u>
Wind Speed	At $ws \leq 5$ m/s, input ± 0.25 m/s; At $ws > 5$ m/s, input $\pm 5\%$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direction	input $\pm 5^\circ$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperature	input $\pm 0.5^\circ$ C input $\pm 2.0^\circ$ C for PM-10, PM-2.5 samplers
Relative Humidity	Ambient: input $\pm 5\%$ RH, $\pm 1.5^\circ$ C as dew point Gravimetry Lab: input $\pm 5\%$
Precipitation	input $\pm 10\%$
Barometric Pressure	Ambient: input ± 10 hPa TEOM: ± 10 mm mercury
PM-10: Hi-Vol SSI, Partisol, BGI, PM-2.5	input $\pm 10\%$; Design Flow $\pm 10\%$ input $\pm 4\%$; Design Flow $\pm 5\%$
TEOM: Total Flow Main Flow Bypass Flow	input $\pm 10\%$; Design Flow $\pm 10\%$ input $\pm 10\%$; Design Flow $\pm 10\%$ input $\pm 10\%$; Design Flow $\pm 10\%$
TEOM: Leak Check	Main Flow: < 0.15 LPM Bypass Flow: < 0.60 LPM

Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

<u>AUDIT DEVICE</u>	<u>Serial #</u>	<u>Cal Date:</u>	<u>Slope:</u>	<u>Intercept:</u>
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:	RH 03	12/10/04	Wet 1.0037 Dry 1.0059	Wet -0.0598 Dry -0.1518
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

Great Basin Unified Air Pollution Control District
Tapered Element Oscillating Microbalance (TEOM)

FLOW AUDIT

Date: 4/20/11
Start: 13:25
Finish: 13:45

PST
PST

Site Name: Lynch Jail
Operator: Scott Weaver
Project: SB270

Site Elevation: ft
Amb. Press.: 886.4 in. Hg
Amb. Temp.: 25.6 deg. C

Prop. Or Ser. No.: 24983
Type: PM10

Make: R&P
Model: 1400a
Last Cal. Date: 3/17/11

Audit Device(s)

Make: BGI INCORPORATED
Model: DELTA CAL
S/N: 0123-525
Range: 2 - 20 lpm
Calibration factors:
Slope: 1.0
Int.: 0.0
Cal Date: 1/4/11

Make: BGI INCORPORATED
Model: DELTA CAL
S/N: 0123
Range: 2 - 20 lpm
Calibration factors:
Slope: 1.0
Int.: 0.0
Cal Date: 1/4/11

$$Q_s = m[dP \times T_s / P_s]^{1/2} + b$$

Altitude Correction Factor: ÷ 1013

Leak Check-Initial Main: .05 Aux: .38
Leak Check-Final Main: Aux:

Audit Point	Audit Flow Rate delta P (VLPM)	Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates	
				Lower Limit (LPM)	Upper Limit (LPM)

Total Flow Rate	16.49	299/13.64 = 16.63		15.0	18.4
Aux. Flow Rate	13.836	13.64			
Main Flow Rate	2.912	2.99		2.7	3.3
Total Flow Rate	16.46	16.63		15.0	18.4


	Sampler	Standard	
		True	Raw
Amb Temp	25.2		25.6
Amb Press	887.2	883.34	886.4

Comments:

Calibrated By: Mike [Signature]

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE: January 19, 2011
TO: Chris Lanane, Scott Weaver
FROM: Mike Horn 
SUBJECT: Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Lizard Tail, January 19, 2011," for your review. Please refer any comments you may have on the document to me by March 21, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District
Quality Assurance
Audit Report

SITE:
LIZARD TAIL

Report Date: January 19, 2011
Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Lizard Tail was audited on January 18, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

Great Basin Unified Air Pollution Control District
Tapered Element Oscillating Microbalance (TEOM)
AUDIT

Date of report:	1/19/11			
Date:	1/18/11	Site name:	Lizard Tail	
Start:	14:25hrs. PST	Operator:	Scott Weaver	
Finish:	14:40hrs. PST	Project:	SB 270	
Audited By:	Mike Horn	Site Elevation:	3603	ft.
Witness:	Scott Weaver	Amb. Pres.:	893.10	hPa
		Amb. Temp.:	19.6	deg. C
Prop. or Serial No.:	24983	Make:	R & P	
Type:	PM-10	Model:	1400ab	
		Last cal. date:	12/7/10	

AUDIT DEVICE(S)

Make: BGI Incorporated
Model: DELTA CAL
S/N: 525
Range: 2 - 20 lpm

Calibration Factors

Slope: 1.00
Intercept: 0.00
Cal date: 1/4/11

	Main:	Aux:	Sampler temp:
Leak check:	0.050	0.320	19.4
Dark current:	N/A	N/A	

$$Q_a = [dP \times T_a / P_a]^{1/2} + b$$

Make: BGI Incorporated
Model: DELTA CAL
S/N: 525
Range: 2 - 20 lpm

Calibration Factors

Slope: 1.00
Intercept: 0.00
Cal Date: 1/4/11

<u>Diff.</u>	Sampler press:	<u>Diff.</u>
-0.2	890.43	-2.7

Audit Point	Qa=[dPxTa/Pa] ^{1/2} +b		Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates	
	Audit Flow Rate, ΔP, in. H2O	(VLPM)			Lower Limit (LPM)	Upper Limit (LPM)
Total Flow Rate	16.49	16.49	16.63	0.8	15.0	18.4
Bypass/Aux Flow Rate	13.46	13.46	13.64	1.3		
Main Flow Rate	3.00	3.00	2.99	-0.3	2.7	3.3
Total Flow Rate	16.46	16.46	16.63	1.0	15.0	18.4

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

<u>Measurement Variable</u>	<u>Evaluation Criteria</u>
Wind Speed	At $ws \leq 5$ m/s, input ± 0.25 m/s; At $ws > 5$ m/s, input $\pm 5\%$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direction	input $\pm 5^\circ$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperature	input $\pm 0.5^\circ$ C input $\pm 2.0^\circ$ C for PM-10, PM-2.5 samplers
Relative Humidity	Ambient: input $\pm 5\%$ RH, $\pm 1.5^\circ$ C as dew point Gravimetry Lab: input $\pm 5\%$
Precipitation	input $\pm 10\%$
Barometric Pressure	Ambient: input ± 10 hPa TEOM: ± 10 mm mercury
PM-10: Hi-Vol SSI, Partisol, BGI, PM-2.5	input $\pm 10\%$; Design Flow $\pm 10\%$ input $\pm 4\%$; Design Flow $\pm 5\%$
TEOM: Total Flow Main Flow Bypass Flow	input $\pm 10\%$; Design Flow $\pm 10\%$ input $\pm 10\%$; Design Flow $\pm 10\%$ input $\pm 10\%$; Design Flow $\pm 10\%$
TEOM: Leak Check	Main Flow: < 0.15 LPM Bypass Flow: < 0.60 LPM

Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE

	<u>Serial #</u>	<u>Cal Date:</u>	<u>Slope:</u>	<u>Intercept:</u>
BGI Delta CAL:	123	12/22/09	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:	RH 03	12/10/04	Wet 1.0037	Wet -0.0598
			Dry 1.0059	Dry -0.1518
Texas Electronics FC-525 Precipitation:	52202	N/A		

**Great Basin Unified Air Pollution Control District
Tapered Element Oscillating Microbalance (TEOM)**

FLOW AUDIT

Date: 1/18/11
Start: 14:25
Finish: 14:40

PST
PST

Site Name: Logans Tail
Operator: Linda Weaver
Project: SB270

Site Elevation: ft
Amb. Press.: 893.1 in. Hg
Amb. Temp.: 19.6 deg. C

Prop. Or Ser. No.: 24983
Type: PM10

Make: R&P
Model: 1400a
Last Cal. Date: 12/7/10

Audit Device(s)

Make: BGI INCORPORATED
Model: DELTA CAL
S/N: 0123-525
Range: 2 - 20 lpm

Make: BGI INCORPORATED
Model: DELTA CAL
S/N: 0123
Range: 2 - 20 lpm

Calibration factors:
Slope: 1.0
Int.: 0.0
Cal Date: 1/4/11

Calibration factors:
Slope: 1.0
Int.: 0.0
Cal Date:

$$Q_s = m[dP \times T_s / P_s]^{1/2} + b$$

Altitude Correction Factor: $\div 1013$

Leak Check-Initial Main: .05 Aux: .32
Leak Check-Final Main: Aux:

Audit Point	Audit Flow Rate delta P (VLPM)	Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates	
				Lower Limit (LPM)	Upper Limit (LPM)
Total Flow Rate	16.49	2.99/13.64 = 16.63		15.0	18.4
Aux. Flow Rate	13.46	13.64			
Main Flow Rate	3.00	2.99		2.7	3.3
Total Flow Rate	16.46	16.63		15.0	18.4

	Sampler	Standard	
		True	Raw
Amb Temp	19.4		19.6
Amb Press	879	890.43	893.1

Comments:

Calibrated By: Mike [Signature]